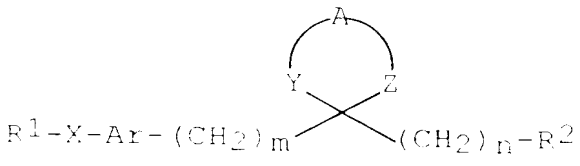
CLAIMS

1. A compound of the formula:



(I)

in which R^1 is lower alkyl, halogen, optionally substituted heterocyclic group or optionally substituted aryl,

R^2 is carboxy, protected carboxy or amidated carboxy,

Ar is optionally substituted aryl or optionally substituted heterocyclic group,

A is lower alkylene,

X is oxa or a single bond,

Y is thia, sulfinyl or sulfonyl,

Z is methylene, thia, sulfinyl or sulfonyl,

m and n are each an integer of 0 to 6, and

$1 \leq m+n \leq 6$,

and its salt.

2. The compound of claim 1, in which the heterocyclic group of R^1 and Ar are selected from the group consisting of the following (1) to (14),

(1) unsaturated 3- to 8-membered, heteromonocyclic group containing 1 to 4 nitrogen atoms,

(2) saturated 3- to 8-membered, heteromonocyclic group containing 1 to 4 nitrogen atoms,

(3) unsaturated 3- to 8-membered,

heteromonocyclic group containing 1 or 2 sulfur atoms,

(4) unsaturated condensed 7- to 13-membered, heterocyclic group containing 1 to 5 nitrogen atoms,

(5) unsaturated 3- to 8-membered, heteromonocyclic group containing 1 or 2 oxygen atoms,

(6) saturated 3- to 8-membered, heteromonocyclic group containing 1 or 2 oxygen atoms,

(7) unsaturated 3- to 8-membered, heteromonocyclic group containing 1 or 2 oxygen atoms and 1 to 3 nitrogen atoms,

(8) unsaturated condensed 7- to 13-membered, heterocyclic group containing 1 or 2 oxygen atoms,

(9) unsaturated condensed 7- to 13-membered, heterocyclic group containing 1 or 2 sulfur atoms,

(10) saturated 3- to 8-membered, heteromonocyclic group containing 1 or 2 oxygen atoms and 1 to 3 nitrogen atoms,

(11) unsaturated condensed 7- to 13-membered, heterocyclic group containing 1 or 2 oxygen atoms and 1 to 3 nitrogen atoms,

(12) unsaturated 3- to 8-membered, heteromonocyclic group containing 1 or 2 sulfur atoms and 1 to 3 nitrogen atoms,

(13) saturated 3- to 8-membered, heteromonocyclic group containing 1 or 2 sulfur atoms and 1 to 3 nitrogen atoms, and

(14) unsaturated condensed 7- to 13-membered, heterocyclic group containing 1 or 2 sulfur atoms and 1 to 3 nitrogen atoms, and

the aryl group of R^1 and Ar is C_6-C_{10} aryl, and further,

each of the above-mentioned heterocyclic group and aryl group are optionally substituted by the group consisting of the following (A1) to (A35);

(A1) halogen,

(A2) lower alkyl,

(A3) lower alkoxy,

(A4) halo(lower)alkyl,

(A5) halo(lower)alkoxy,

(A6) lower alkenyl,

(A7) acyl,

(A8) lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,

(A9) C_6-C_{10} aryl,

(A10) halo(C_6-C_{10})aryl,

(A11) hydroxy,

(A12) hydroxy(lower)alkyl, protected hydroxy(lower)alkyl,

(A13) amino,

(A14) carboxy,

(A15) protected carboxy,

(A16) nitro(lower)alkenyl,

(A17) lower alkylenedioxy,

(A18) acylamino,

(A19) nitro,

(A20) (C_6-C_{10})aryl(lower)alkoxy,

(A21) carbamoyl(lower)alkenyl optionally N-substituted by the group consisting of lower alkyl, C_6-C_{10} aryl, lower alkoxy(C_6-C_{10})-aryl, and halo(C_6-C_{10})aryl,

(A22) lower alkylaminocarbonyloxy,

(A23) lower alkanoyloxy,

(A24) lower alkoxy(lower)alkanoyloxy,

(A25) lower alkoxycarbonyloxy,

(A26) lower alkenoyloxy optionally substituted by heterocyclic group of the above (1) to (14),

(A27) lower cycloalkanecarbonyloxy,

(A28) lower alkoxy substituted by the group consisting of carboxy, protected carboxy, lower alkanoyl, lower cycloalkanecarbamoyl, and lower alkylcarbamoyl,

(A29) lower alkylcarbamoyloxy(lower)alkyl,

(A30) lower alkoxycarbonylamino(lower)alkyl,

(A31) amino(lower)alkyl,

(A32) lower alkylcarbamoyl(lower)alkyl,

(A33) heterocyclic-carbonylamino, the heterocyclic group being selected from the above (1) to (14) and optionally being substituted N-protective group,

(A34) the above heterocyclic groups (1) to (14) being optionally substituted by lower alkyl, and

(A35) oxo.

3. The compound of claim 2, in which

R^1 is lower alkyl; halogen; optionally substituted heterocyclic group consisting of the following (1) to (10); or aryl consisting of phenyl and naphtyl;

R^2 is carboxy, lower alkoxycarbonyl, hydroxyaminocarbonyl, tetrahydropyranyloxyaminocarbonyl, or phenyl(lower)alkylaminocarbonyl,

Ar is phenyl or heterocyclic group of the following (3), and

m and n are each an integer of 0 or 1, and m+n=1 or 2,

wherein the above-mentioned heterocyclic group is;

(1) unsaturated 5- or 6-membered heteromonocyclic

group containing 1 to 4 nitrogen atoms,
(2) saturated 5- or 6-membered, heteromonocyclic group containing 1 to 4 nitrogen atoms,
(3) unsaturated 5- or 6-membered heteromonocyclic group containing 1 to 2 sulfur atoms,
(4) unsaturated bicyclic 9- or 10-membered, heterocyclic group containing 1 to 5 nitrogen atoms,
(5) unsaturated 5- or 6-membered heteromonocyclic group containing 1 to 2 oxygen atoms,
(6) saturated 5- or 6-membered, heteromonocyclic group containing 1 or 2 oxygen atoms,
(7) unsaturated 5- or 6-membered, heteromonocyclic group containing 1 or 2 oxygen atoms and 1 to 3 nitrogen atoms,
(8) unsaturated bicyclic 9- or 10-membered, heterocyclic group containing 1 or 2 oxygen atoms,
(9) unsaturated bicyclic 9- or 10-membered, heterocyclic group containing 1 or 2 sulfur atoms, or
(10) saturated 5- or 6-membered, heteromonocyclic group containing 1 or 2 oxygen atoms and 1 to 3 nitrogen atoms,

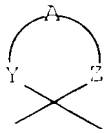
wherein the heterocyclic group being optionally substituted by the group consisting of the following (B1) to (B8);

(B1) lower alkanoyl,
(B2) lower alkyl,
(B3) lower alkoxy,
(B4) lower alkoxycarbonylamino,
(B5) carbamoyl or lower alkylcarbamoyl,
(B6) lower alkoxycarbonyl,
(B7) halo, and
(B8) oxo;

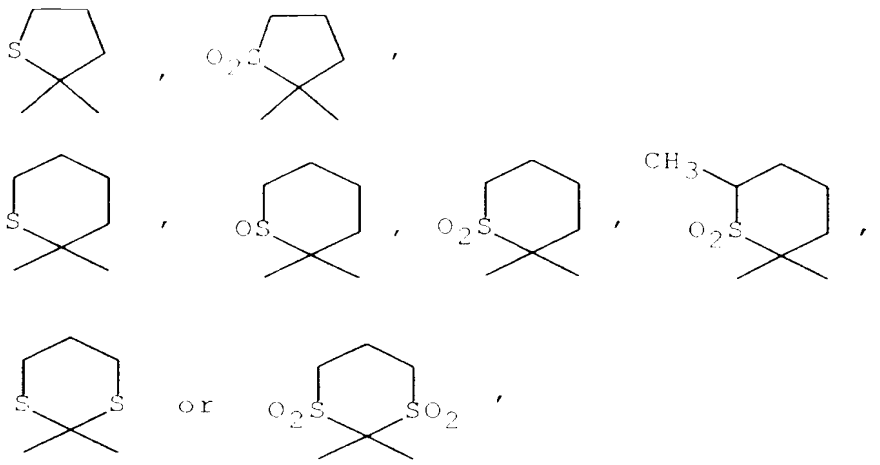
and the above-mentioned aryl is optionally

substituted by the group consisting of the (A1) to (A35) as defined in claim 2.

4. The compound of claim 3, in which a group of the formula:



is one of the following formulae:



R^1 is lower alkyl; halogen; optionally substituted heterocyclic group consisting of the following (1) to (10); or aryl consisting of phenyl and naphtyl,

R^2 is carboxy, lower alkoxycarbonyl, hydroxyaminocarbonyl, or tetrahydropyranyloxyaminocarbonyl,

Ar is phenyl or heterocyclic group of the following (3), and

m and n are each an integer of 0 or 1, and m+n=1 or 2,

wherein the above-mentioned heterocyclic group is

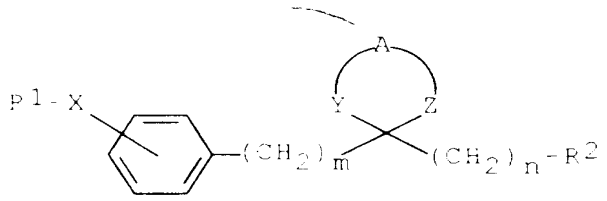
(1) pyrrolyl, pyrrolinyl, imidazolyl, pyrazolyl, pyridyl, pyridyl N-oxide, pyrimidyl, pyrazinyl, pyridazinyl, triazolyl, tetrazolyl,

dihydrotriazinyl,
(2) azetidinyl, pyrrolidinyl, imidazolidinyl, piperidinyl, piperidino, pyrazolidinyl, piperazinyl,
(3) thienyl,
(4) indolyl, isoindolyl, indolizinyl, benzimidazolyl, quinolyl, isoquinolyl, tetrahydroisoquinolyl, indazolyl, benzotriazolyl, tetrazolopyridyl, tetrazolopyridazinyl, dihydrotriazolopyridazinyl,
(5) furyl,
(6) oxolanyl,
(7) oxazolyl, isoxazolyl, oxadiazolyl,
(8) benzofuranyl, benzodihydrofuranyl, benzodioxolenyl,
(9) benzothienyl, dihydrobenzothienyl,
(10) morpholinyl, morpholino,
wherein the heterocyclic group being optionally substituted by the group consisting of the (B1) to (B8) as defined in claim 3,
and the above-mentioned aryl is optionally substituted by the group consisting of following (A1) to (A34),
(A1) halogen,
(A2) lower alkyl,
(A3) lower alkoxy,
(A4) halo(lower)alkyl,
(A5) halo(lower)alkoxy,
(A6) lower alkenyl,
(A7) acyl,
(A8) lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,
(A9) C_6-C_{10} aryl
(A10) halo(C_6-C_{10})aryl,

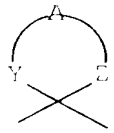
(A11) hydroxy,
(A12) hydroxy(lower)alkyl or protected hydroxy(lower)alkyl,
(A13) amino,
(A14) carboxy,
(A15) protected carboxy,
(A16) nitro(lower)alkenyl,
(A17) lower alkylenedioxy,
(A18) acylamino,
(A19) nitro,
(A20) (C_6-C_{10})aryl(lower)alkoxy,
(A21) carbamoyl(lower)alkenyl optionally N-substituted by the group consisting of lower alkyl, (C_6-C_{10})aryl, lower alkoxy(C_6-C_{10})-aryl, and halo(C_6-C_{10})aryl,
(A22) lower alkylaminocarbonyloxy,
(A23) lower alkanoyloxy,
(A24) lower alkoxy(lower)alkanoyloxy,
(A25) lower alkoxycarbonyloxy,
(A26) lower alkenoyloxy optionally substituted by the above heterocyclic group (1),
(A27) lower cycloalkanecarbonyloxy,
(A28) lower alkoxy substituted by the group consisting of carboxy, protected carboxy, lower alkanoyl, lower cycloalkanecarbamoyl, and lower alkylcarbamoyl,
(A29) lower alkylcarbamoyloxy(lower)alkyl,
(A30) lower alkoxycarbonylamino(lower)alkyl,
(A31) amino(lower)alkyl,
(A32) lower alkylcarbamoyl(lower)alkyl,
(A33) heterocyclic-carbonylamino, the heterocyclic group being selected from the above (2), (4) and (5) and optionally substituted by N-protective group, and
(A34) the heterocyclic group of the above (7) being

optionally substituted by lower alkyl.

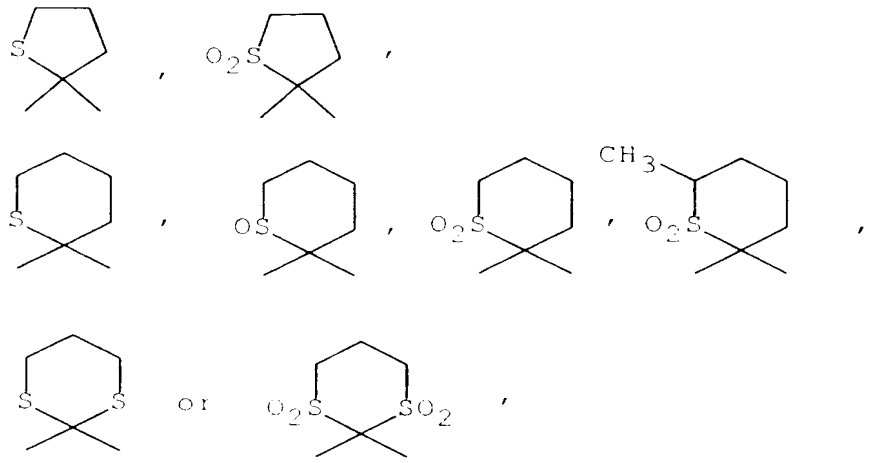
5. The compound of claim 4, having the following formula:



wherein a group of the formula:



is one of the following formulae:

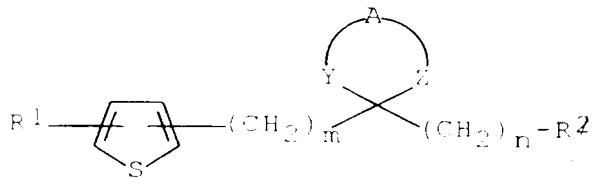


R^1 is lower alkyl, phenyl, halophenyl, or (halo)(phenyl)phenyl,

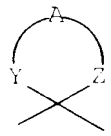
R^2 is carboxy or hydroxyaminocarbonyl, and

m and n are each an integer of 0 or 1, and m+n=1.

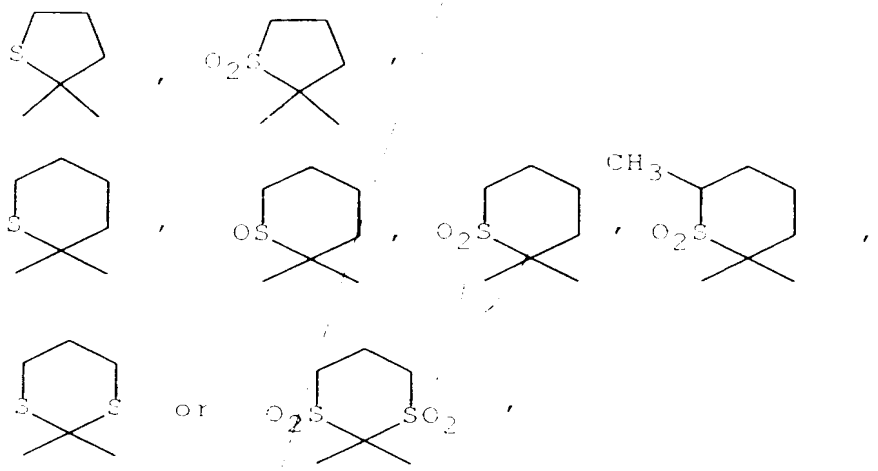
6. The compound of claim 4, having the following formula:



wherein a group of the formula:



is one of the following formulae:



R^2 is carboxy or hydroxyaminocarbonyl,

m and n are each an integer of 0 or 1, and m+n=1,

R^1 is halogen; heterocyclic group consisting of pyridyl, thienyl, furyl, benzofuranyl or benzothienyl, wherein the heterocyclic group is optionally substituted by the group consisting of lower alkanoyl, lower alkyl, lower alkoxy, lower alkoxycarbonylamino and lower alkylcarbamoyl; naphtyl or phenyl optionally substituted by the group consisting of the following (C1) to (C31);

(C1) halogen,

(C2) lower alkyl,

(C3) lower alkoxy,
(C4) halo(lower)alkyl,
(C5) halo(lower)alkoxy,
(C6) lower alkenyl,
(C7) lower alkylcarbamoyl, carbamoyl, phenyl(lower)alkylcarbamoyl, lower alkanoyl,
(C8) lower alkylthio, lower alkylsulfinyl, lower alkylsulfonyl,
(C9) phenyl, naphthyl,
(C10) halophenyl,
(C11) hydroxy,
(C12) mono- or dihydroxy(lower)alkyl, phenoxycarbonyloxy(lower)alkyl
(C13) amino,
(C14) carboxy,
(C15) lower alkylenedioxy,
(C16) lower alkanoylamino, phenyl(lower)alkanoylamino, halophenyl(lower)alkanoylamino, lower alkoxy(lower)alkanoylamino, lower alkoxy(lower)alkanoylamino, phenoxy(lower)alkanoylamino, lower alkoxyphenoxy(lower)alkanoylamino, lower alkylphenoxy(lower)alkanoylamino, halophenoxy(lower)alkanoylamino, carboxy(lower)alkanoylamino, lower alkoxycarbonyl(lower)alkanoylamino, lower alkylcarbamoyl(lower)alkanoylamino, halo(lower)alkanoylamino, lower alkenyl(lower)alkanoylamino, lower alkoxy(lower)alkanoylamino, phenyl(lower)alkoxy(lower)alkanoylamino, piperidinyloxy(lower)alkanoylamino, N-lower alkoxycarbonylpiperidinyloxy-(lower)alkanoylamino,

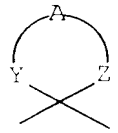
pyridyloxy(lower)alkanoylamino,
hydroxy(lower)alkanoylamino,
lower alkanoyloxy(lower)alkanoylamino,
lower alkylcarbamoyloxy(lower)alkanoylamino,
N,N-di(lower alkyl)carbamoyloxy,
piperidino-carbonyloxy(lower)alkanoylamino,
phenyl(lower)alkylcarbamoyloxy(lower)-
alkanoylamino, lower
alkoxycarbonylamino(lower)alkanoylamino,
amino(lower)alkanoylamino, lower
alkoxycarbonylamino(lower)alkanoylamino,
fluorenylmethoxycarbonylamino(lower)-
alkanoylamino,
lower alkylamino(lower)alkanoylamino, [N,N-
di(lower alkyl)amino](lower)alkanoylamino,
[N-lower alkyl-N-(lower alkoxycarbonyl)-
amino](lower)alkanoylamino, [N-lower alkyl-N-
(fluorenylmethoxycarbonyl)amino]-
(lower)alkanoylamino,
[N-lower alkyl-N-(mono- or di(lower)-
alkylcarbamoyl)amino](lower)alkanoylamino,
[N-(mono- or di(lower alkyl)carbamoyl)-
amino](lower)alkanoylamino,
benzoylamino(lower)alkanoylamino, lower
alkanoylamino(lower)alkanoylamino, lower
alkanesulfonylamino(lower)alkanoylamino,
lower alkoxy(lower)alkanoylamino-
(lower)alkanoylamino,
cyclo(lower)alkyloxycarbonylamino-
(lower)alkanoylamino,
pyridylcarbonylamino(lower)alkanoylamino,
morpholinocarbonylamino(lower)alkanoylamino,
phenyl(lower)alkoxyoxycarbonylamino-
(lower)alkanoylamino,
lower alkoxyphenylsulfonylamino-

(lower)alkanoylamino,
hydroxy(lower)alkylamino(lower)alkanoylamino,
morpholino(lower)alkanoylamino,
oxooxazolidinyl(lower)alkanoylamino,
oxopyrrolidinyl(lower)alkanoylamino,
trimethylhydantoinyl(lower)alkanoylamino,
lower alkenylamino(lower)alkanoylamino,
lower alkoxy(lower)alkylamino(lower)-
alkanoylamino,
phenyl(lower)alkylamino(lower)alkanoylamino,
pyridyl(lower)alkylamino(lower)alkanoylamino,
lower alkoxycarbonylamino,
phenyl(lower)alkoxycarbonylamino,
lower alkoxy(lower)alkoxycarbonylamino,
halo(lower)alkoxycarbonylamino,
amino(lower)alkoxycarbonylamino,
phthalimido(lower)alkoxycarbonylamino,
carbamoylamino,
(mono- or di(lower alkyl)carbamoylamino,
naphthylcarbamoylamino,
halophenylcarbamoylamino,
lower alkoxyphenylcarbamoylamino,
lower alkenylcarbamoylamino,
cyclo(lower)alkyl(lower)alkylcarbamoylamino,
phenyl(lower)alkylcarbamoylamino,
halo(lower)alkylcarbamoylamino,
lower alkoxy(lower)alkylcarbamoylamino,
hydroxy(lower)alkylcarbamoylamino, (lower
alkyl)(diphenyl)silyloxy(lower)alkyl-
carbamoylamino,
carboxy(lower)alkylcarbamoylamino, lower
alkoxycarbonyl(lower)alkylcarbamoylamino,
lower alkylcarbamoyl(lower)alkyl-
carbamoylamino, or
pyridylcarbamoylamino,

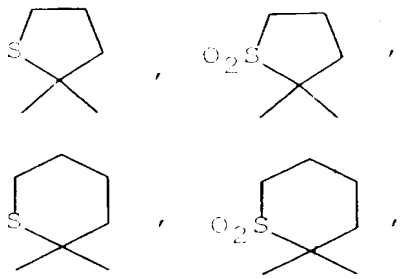
lower alkylsulfonylamino,
lower alkenoylamino,
lower cycloalkanecarbonylamino,
lower alkenyloxycarbonylamino,
phenoxycarbonylamino,
lower alkylthiocarbonylamino,
(C17) phenyl(lower)alkoxy,
(C18) lower alkenyl, mono- or di(lower alkyl)carbamoyl(lower)alkenyl, (2-(methylcarbamoyl)ethenyl, 2-(ethylcarbamoyl)ethenyl, 2-(propylcarbamoyl)ethenyl, 2-(isopropylcarbamoyl)ethenyl, 2-(dimethylcarbamoyl)ethenyl,)
phenylcarbamoyl(lower)alkenyl,
lower alkoxycarbamoyl(lower)alkenyl,
halophenylcarbamoyl(lower)alkenyl,
(C19) lower alkylaminocarbonyloxy,
(C20) lower alkanoyloxy,
(C21) lower alkoxy(lower)alkanoyloxy,
(C22) lower alkoxycarbonyloxy,
(C23) pyridyl(lower)alkenoyloxy
(C24) lower cycloalkanecarbonyloxy,
(C25) carboxy(lower)alkoxy,
lower alkoxycarbonyl(lower)alkoxy,
lower alkanoyl(lower)alkoxy,
lower cycloalkanecarbamoyl(lower)alkoxy,
lower alkylcarbamoyl(lower)alkoxy,
(C26) lower alkylcarbamoyloxy(lower)alkyl,
(C27) lower alkoxycarbonylamino(lower)alkyl,
(C28) amino(lower)alkyl,
(C29) lower alkylcarbamoyl(lower)alkyl,
(C30) furylcarbonylamino,
tetrahydroisoquinolylcarbonylamino,
N-lower alkoxycarbonyl-

tetrahydroisoquinolylcarbonylamino,
pyrrolidinylcarbonylamino,
(C31) oxazolyl, lower alkyloxadiazolyl.

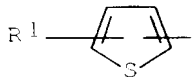
7. The compound of claim 6, in which
a group of the formula:



is one of the following formulae:

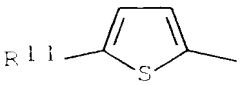


R^2 is hydroxyaminocarbonyl,
m is 0 and n is 1,

a group of the formula: 

is the group of the following formulae (a) to (e);

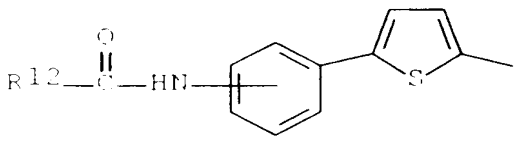
(a)



wherein
R^1 is halo, naphtyl, phenyl, mono- or dihalophenyl,
mono- or di(lower)alkylphenyl, lower alkoxyphenyl,
trihalo(lower)alkylphenyl,
trihalo(lower)alkoxyphenyl, lower alkenylphenyl,
lower alkylcarbamoylphenyl, carbamoylphenyl,

phenyl(lower)alkylcarbamoylphenyl, lower alkanoylphenyl, lower alkylthiophenyl, lower alkylsulfinylphenyl, lower alkylsulfonylphenyl, phenylphenyl, (hal:)(phenyl)phenyl, halophenylphenyl, hydroxyphenyl, mono- or dihydroxy(lower)alkylphenyl, phenoxycarbonyloxy(lower)alkylphenyl, aminophenyl, carboxyphenyl, lower alkylendioxyphenyl, lower alkanesulfonylaminophenyl, lower alkenoylaminophenyl, lower cycloalkanecarbonylaminophenyl, phenyl(lower)alkoxyphenyl, mono- or di(lower alkyl)carbamoyl(lower)alkenylphenyl, phenylcarbamoyl(lower)alkenylphenyl, lower alkoxycarbamoyl(lower)alkenylphenyl, halophenylcarbamoyl(lower)alkenylphenyl, lower alkylcarbamoyloxyphenyl, lower alkanoyloxyphenyl, lower alkoxy(lower)alkanoyloxyphenyl, lower alkoxycarbonyloxyphenyl, pyridyl(lower)alkenoyloxyphenyl, cyclo(lower)alkylcarbonyloxyphenyl, carboxy(lower)alkoxyphenyl, lower alkoxycarbonyl(lower)alkoxyphenyl, lower alkanoyl(lower)alkoxyphenyl, lower cycloalkanecarbamoyl(lower)alkoxyphenyl, lower alkylcarbamoyl(lower)alkoxyphenyl, lower alkylcarbamoyloxy(lower)alkylphenyl, lower alkoxycarbonylamino(lower)alkylphenyl, amino(lower)alkylphenyl, lower alkylcarbamoyl(lower)alkylphenyl, furylcarbonylaminophenyl, 1,2,3,4-tetrahydroisoquinolylcarbonylaminophenyl, N-t-butoxycarbonyl, 1,2,3,4-tetrahydroisoquinolylcarbonylaminophenyl, pyrrolidinylcarbonylaminophenyl, oxazolylphenyl, lower alkyloxadiazolylphenyl.

(b)

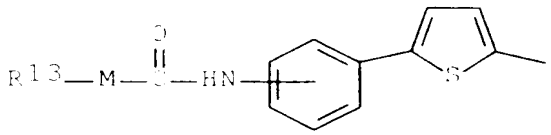


wherein

R^{12} is lower alkyl optionally substituted by the group consisting of phenyl, halophenyl, lower alkoxyphenyl, lower alkoxy, phenoxy, lower alkoxyphenoxy, halophenoxy, lower alkylphenoxy, carboxy, lower alkoxycarbonyl, lower alkylcarbamoyl, halo, lower alkenyloxy, lower alkoxy(lower)alkoxy, phenyl(lower)alkoxy, piperidinyloxy, N-lower alkoxycarbonyl-piperidinyloxy, pyridyloxy, hydroxy, lower alkanoyloxy, mono- or di(lower)alkylcarbamoyloxy, piperidinylcarbonyloxy, phenyl(lower)alkylcarbamoyloxy, lower alkoxycarbonylamino, amino, lower alkoxycarbonylamino, fluorenylmethoxycarbonylamino, mono- or di(lower)alkylamino, N-lower alkyl-N-(lower alkoxycarbonyl)amino, N-lower alkyl-N-(fluorenylmethoxycarbonyl)amino, N-lower alkyl-N-(mono- or di(lower)alkylcarbamoyl)amino, N-(mono- or di(lower alkyl)carbamoyl)amino, benzoylamino, lower alkanoylamino, lower alkanesulfonylamino, lower alkoxy(lower)alkanoylamino, cyclo(lower)alkyloxycarbonylamino, pyridylcarbonylamino, morpholinocarbonylamino, phenyl(lower)alkoxyoxycarbonylamino, lower alkoxyphenylsulfonylamino, hydroxy(lower)alkylamino, morpholino, oxooxazolidinyl, oxopyrrolidinyl, trimethylhydantoinyl, pyridyl, lower alkenylamino, lower alkoxy(lower)alkylamino,

phenyl(lower)alkylamino, pyridyl(lower)alkylamino, and cyclo(lower)alkyl,

(c)

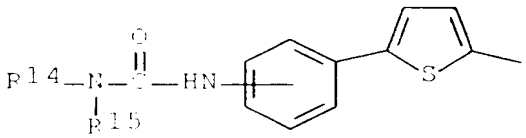


wherein

M is oxygen or sulfur,

R^{13} is lower alkyl, phenyl(lower)alkyl, lower alkoxy(lower)alkyl, halo(lower)alkyl, amino(lower)alkyl, or phthalimido(lower)alkoxycarbonylamino, lower alkenyl, phenyl,

(d)

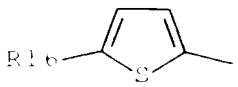


wherein

R^{15} is hydrogen or lower alkyl,

R^{14} is hydrogen, lower alkyl, naphthyl, halophenyl, lower alkoxyphenyl, lower alkenyl, lower cycloalyl(lower)alkyl, phenyl(lower)alkyl, halo(lower)alkyl, lower alkoxy(lower)alkyl, hydroxy(lower)alkyl, (lower alkyl)(diphenyl)silyloxy(lower)alkyl, carboxy(lower)alkyl, lower alkoxycarbonyl(lower)alkyl, lower alkylcarbamoyl(lower)alkyl, or pyridyl,

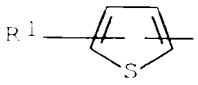
(e)



wherein

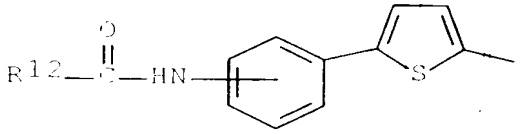
R^{16} is benzothienyl, benzofuranyl, thienyl, furyl, lower alkylpyridyl, pyridyl, lower alkoxypyridyl, lower alkoxycarbonylaminopyridyl, lower alkanoylthienyl, lower alkylcarbamoylbenzofuranyl.

8. The compound of claim 7, wherein

a group of the formula: 

is the same group as (a), (c), (d) and (e) of claim 7, and the following formula (b):

(b)



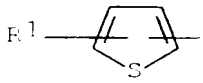
wherein

R^{12} is lower alkyl, phenyl(lower)alkyl, halophenyl(lower)alkyl, lower alkoxyphenyl(lower)alkyl, lower alkoxy(lower)alkyl, phenoxy(lower)alkyl, lower alkoxyphenoxy(lower)alkyl, halophenoxy(lower)alkyl, lower alkylphenoxy(lower)alkyl, carboxy(lower)alkyl, lower alkoxycarbonyl(lower)alkyl, lower alkylcarbamoyl(lower)alkyl, halo(lower)alkyl, lower alkenyloxy(lower)alkyl, lower alkoxy(lower)alkoxy(lower)alkyl, phenyl(lower)alkoxy(lower)alkyl, piperidinyloxy(lower)alkyl, N-t-butoxycarbonylpiperidinyloxy(lower)alkyl,

pyridyloxy(lower)alkyl, hydroxy(lower)alkyl,
lower alkanoyloxy(lower)alkyl,
mono- or di(lower)alkylcarbamoyloxy(lower)alkyl,
piperidinylcarbonyloxy(lower)alkyl,
pheny(lower)alkylcarbamoyloxy(lower)alkyl,
lower alkoxycarbonylamino(lower)alkyl,
amino(lower)alkyl,
lower alkoxycarbonylamino(lower)alkyl,
fluorenylmethoxycarbonylamino(lower)alkyl,
mono- or di(lower)alkylamino(lower)alkyl,
N-lower alkyl-N-(lower
alkoxycarbonyl)amino(lower)alkyl,
N-lower alkyl-N-(fluorenylmethoxycarbonyl)amino-
(lower)alkyl, N-lower alkyl-N-(mono- or di(lower)-
alkylcarbamoyl)amino(lower)alkyl, N-(mono- or
di(lower alkyl)carbamoyl)amino(lower)alkyl,
benzoylamino(lower)alkyl,
lower alkanoylamino(lower)alkyl,
lower alkanesulfonylamino(lower)alkyl,
lower alkoxy(lower)alkanoylamino(lower)alkyl,
cyclo(lower)alkyloxycarbonylamino(lower)alkyl,
pyridylcarbonylamino(lower)alkyl,
morpholinocarbonylamino(lower)alkyl,
phenyl(lower)alkoxyoxycarbonylamino(lower)alkyl,
lower alkoxyphenylsulfonylamino(lower)alkyl,
hydroxy(lower)alkylamino(lower)alkyl,
morpholino(lower)alkyl, oxooxazolidinyl(lower)alkyl,
oxopyrrolidinyl(lower)alkyl,
trimethylhydantoinyl(lower)alkyl,
pyridyl(lower)alkyl, lower alkenylamino(lower)alkyl,
lower alkoxy(lower)alkylamino(lower)alkyl,
phenyl(lower)alkylamino(lower)alkyl,
pyridyl(lower)alkylamino(lower)alkyl,
cyclo(lower)alkyl, (amino)(phenyl)(lower)alkylamino,
(lower alkoxycarbonylamino)(phenyl)(lower)alkyl,

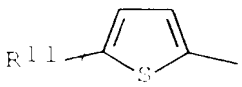
(amino)(lower alkoxy)(lower)alkyl, (lower alkoxycarbonylamino)(lower alkoxy)(lower)alkyl, (amino)(carboxy)(lower)alkyl, (lower alkoxycarbonylamino)(carboxy)(lower)alkyl, (amino)(lower alkoxycarbonyl)(lower)alkyl, (lower alkoxycarbonylamino)(lower alkoxycarbonyl)-(lower)alkyl, (amino)(phenyl(lower)alkoxy)-(lower)alkyl, (lower alkoxycarbonylamino)-(phenyl(lower)alkoxy)(lower)alkyl, (amino)(pyridyl)(lower)alkyl, (lower alkoxycarbonylamino)(pyridyl)(lower)alkyl, (amino)(hydroxy)(lower)alkyl, (lower alkoxycarbonylamino)(hydroxy)(lower)alkyl, (amino)(amino)(lower)alkyl, (lower alkoxycarbonylamino)(amino)(lower)alkyl, (amino)(lower alkoxycarbonylamino)(lower)alkyl, (lower alkoxycarbonylamino)(lower alkoxycarbonylamino)(lower)alkyl, (amino)(lower cycloalkane)(lower)alkyl, (lower alkoxycarbonylamino)(lower cycloalkane)(lower)alkyl.

9. The compound of claim 7, in which

a group of the formula: 

is the group of the following formula (a) to (e):

(a)

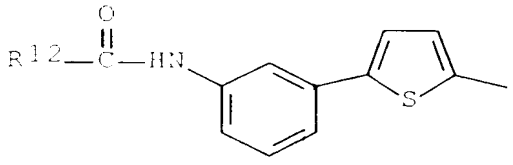


wherein

R^{11} is bromo, 2-naphthyl, phenyl,
3(or 4)-chlorophenyl, 2(or 3 or 4)-fluorophenyl,
3,4-dichlorophenyl, 3,5-difluorophenyl,
3(or 4)-methylphenyl, 4-ethylphenyl,
4-isopropylphenyl, 4-(t-butyl)phenyl,
3,4-dimethylphenyl, 4-methoxyphenyl,
4-ethoxyphenyl, 4-trifluoromethylphenyl,
4-trifluoromethoxyphenyl, 4-ethenylphenyl,
4-methylcarbamoylphenyl, 4-ethylcarbamoylphenyl, 4-carbamoylphenyl, 4-benzylcarbamoylphenyl,
4-acetylphenyl, 4-methylthiophenyl,
4-ethylthiophenyl, 4-methylsulfinylphenyl,
4-methylsulfonylphenyl, phenylphenyl, 4-phenyl-3-fluorophenyl, 4-(4-fluorophenyl)phenyl, 3(or 4)-hydroxyphenyl, 3(or 4)-hydroxymethylphenyl,
4-(1,2-dihydroxyethyl)phenyl,
4-(phenoxycarbonyloxymethyl)phenyl, 3(or 4)-aminophenyl, 4-carboxyphenyl,
3,4-methylenedioxyphenyl,
4-(methanesulfonylamino)phenyl,
3-(2-butenoylamino)phenyl,
3-(cyclopropanecarbonylamino)phenyl,
3-(cyclobutanecarbonylamino)phenyl,
3-(cyclopentanecarbonylamino)phenyl,
4-benzyloxyphenyl,
4-(2-(methylcarbamoyl)ethenyl)phenyl,
4-(2-(ethylcarbamoyl)ethenyl)phenyl,
4-(2-(propylcarbamoyl)ethenyl)phenyl,
4-(2-(isopropylcarbamoyl)ethenyl)phenyl,
4-2-(dimethylcarbamoyl)ethenyl)phenyl,
4-(2-(phenylcarbamoyl)ethenyl)phenyl,
4-(2-(methoxyphenylcarbamoyl)ethenyl)phenyl,
4-(2-(4-fluorophenylcarbamoyl)ethenyl)phenyl,
4-(methylaminocarbonyloxy)phenyl,
4-(ethylaminocarbonyloxy)phenyl,

4-propanoyloxyphenyl, 4-(methoxyacetyloxy)phenyl,
4-(ethoxycarbonyloxy)phenyl,
4-(3-(3-pyridyl)acryloyloxy)phenyl,
4-(cyclopropylcarbonyloxy)phenyl,
4-(carboxymethoxy)phenyl,
4-(ethoxycarbonylmethoxy)phenyl,
4-(t-butoxycarbonylmethoxy)phenyl,
4-(propanoylmethoxy)phenyl,
4-(cyclopropylcarbamoylmethoxy)phenyl,
3(or 4)-(methylcarbamoylmethoxy)phenyl,
4-(ethylcarbamoylmethoxy)phenyl,
4-(propylcarbamoylmethoxy)phenyl,
3(or 4)-(methylcarbamoyloxymethyl)phenyl,
4-(methoxycarbonylaminomethyl)phenyl,
4-(t-butoxycarbonylaminomethyl)phenyl,
4-aminomethylphenyl,
4-(methylcarbamoylmethyl)phenyl,
3-(2(or 3)-furylcarbonylamino)phenyl, 3-(1,2,3,4-tetrahydroisoquinolylcarbonylamino)phenyl,
3-(N-(t-butoxycarbonyl)-1,2,3,4-tetrahydroisoquinolylcarbonylamino)phenyl,
3-(pyrrolidinylcarbonylamino)phenyl,
4-(1,3-oxazolyl)phenyl,
4-(5-methyl-1,2,4-oxadiazol-3-yl)phenyl,

(b)



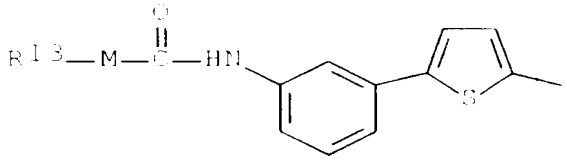
wherein
R^{12} is methyl, ethyl, propyl, isopropyl, butyl, isobutyl, t-butyl, neopentyl, phenylmethyl, 4-chlorophenylmethyl, 4-methoxyphenylmethyl,

methoxymethyl, ethoxymethyl, propoxymethyl, butoxymethyl, isopropyloxymethyl, 1-methoxyethyl, 2-methoxyethyl, phenoxymethyl, 2-phenoxyethyl, 3(or 4)-methoxyphenoxymethyl, 4-fluoro(or chloro)phenoxymethyl, 3(or 4)-methylphenoxymethyl, 2-carboxyethyl, 2-methoxycarbonylethyl, 2-t-butoxycarbonylethyl, 2-methylcarbamoylethyl, 2-chloroethyl, chloromethyl, allyloxymethyl, (2-ethoxyethoxy)methyl, benzyloxymethyl, 4-piperidinyloxymethyl, (N-t-butoxycarbonyl-4-piperidinyl)oxymethyl, 3(or 4)-pyridyloxymethyl, hydroxymethyl, 2-hydroxyethyl, acetoxymethyl, 1-acetoxyethyl, methylcarbamoyloxymethyl, 1-(N-methyl-N-ethylcarbamoyloxy)methyl, (piperidinocarbonyloxy)methyl, (benzylcarbamoyloxy)methyl, (t-butoxycarbonylamino)methyl, aminomethyl, 1-aminoethyl, 1-(t-butoxycarbonylamino)ethyl, 2-aminoethyl, methoxycarbonylaminomethyl, 1-(methoxycarbonylamino)ethyl, ethoxycarbonylaminomethyl, propoxycarbonylaminomethyl, 1-(fluorenylmethoxycarbonylamino)methyl, 2-(t-butoxycarbonylamino)ethyl, 2-(fluorenylmethoxycarbonylamino)ethyl, 1-aminoisopropyl, 1-aminopropyl, 1-(t-butoxycarbonylamino)propyl, 1-(t-butoxycarbonylamino)isopropyl, 1,5-diaminopentyl, 1,5-bis(t-butoxycarbonylamino)-pentyl, methylaminomethyl, ethylaminomethyl, 3-(2-(N-methyl-N-ethylamino)methyl, 3-(dimethylaminomethyl, 3-(pentylaminomethyl, 3-(t-butylaminomethyl, 4-(3-methylaminoethyl, 3-(2-(N-methyl-N-methoxycarbonylamino)methyl, 1-(N-methyl-N-t-butoxycarbonylamino)methyl, 1-(N-ethyl-N-t-butoxycarbonylamino)methyl,

2-(N-methyl-N-(fluorenylmethoxycarbonyl)amino)-ethyl, 2-(N-methyl-N-(t-butoxycarbonyl)amino)ethyl, 1-(N-methyl-N-(dimethylcarbamoyl)amino)methyl, 1-(dimethylcarbamoylamino)methyl, 1-(N-(ethylcarbamoyl)amino)methyl, 2-(N-(ethylcarbamoyl)amino)ethyl, benzoylaminomethyl, 2-benzoylaminoethyl, acetylaminomethyl, isobutyrylaminomethyl, pivaloylaminomethyl, 1-(methanesulfonylamino)methyl, 2-(methanesulfonylamino)ethyl, methoxyacetylaminomethyl, cyclopentyloxycarbonylaminomethyl, pyridylcarbonylaminomethyl, morpholinocarbonylaminomethyl, benzyloxycarbonylaminomethyl, 1-(4-methoxyphenylsulfonylamino)methyl, 1-(2-hydroxyethylamino)methyl, morpholinomethyl, 1-(2-oxo-1,3-oxazolidin-1-yl)methyl, 1-(2-oxopyrrolidin-1-yl)methyl, 1-(3,4,4-trimethylhydantoin-1-yl)methyl, allylaminomethyl, 1-(2-ethoxyethylamino)methyl, benzylaminomethyl, 1-(3-pyridylmethylamino)methyl, 2-phenyl-1-aminoethyl, 1-amino-1-phenylmethyl, 1-t-butoxycarbonylamino-1-phenylmethyl, 1-amino-2-phenylethyl, 1-t-butoxycarbonylamino-2-phenylethyl, 1-amino-2-methoxyethyl, 1-t-butoxycarbonylamino-2-methoxyethyl, 1-amino-3-carboxypropyl, 1-t-butoxycarbonylamino-3-carboxypropyl, 1-amino-3-(t-butoxycarbonyl)propyl, 1-t-butoxycarbonylamino-3-t-butoxycarbonylpropyl, etc.), 1-amino-2-benzyloxyethyl, 1-t-butoxycarbonylamino-2-benzyloxyaminoethyl, 1-amino-2-(3-pyridyl)ethyl, 1-t-butoxycarbonylamino-2-(3-pyridyl)ethyl, 1-amino-2-

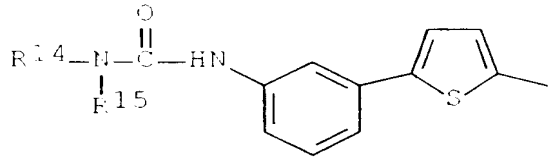
(4-pyridyl)ethyl, 1-t-butoxycarbonylamino-2-(4-pyridyl)ethyl, 1-amino-2-hydroxyethyl, 1-t-butoxycarbonylamino-2-hydroxyethyl, (1,5-diaminopentyl, 1-t-butoxycarbonylamino-5-aminopentyl, 1,5-bis(t-butoxycarbonylamino)pentyl, 1-amino-5-(t-butoxycarbonylamino)pentyl, 1-amino-2-cyclohexylethyl, 1-t-butoxycarbonylamino-2-cyclohexylethyl,

(c)



wherein
M=O and R^{13} is methyl, ethyl, propyl, isopropyl, benzyl, 2-methoxyethyl, 2-choloroethyl, 2-aminoethyl, 2-phthalimidoethyl, allyl, phenyl, or
M=S and R^{13} is methyl, ethyl,

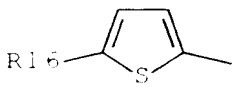
(d)



wherein
R^{15} is hydrogen and
R^{14} is hydrogen, methyl, ethyl, propyl, isopropyl, butyl, isobutyl, pentyl, hexyl, 1-naphthyl, 3(or 4)-chlorophenyl, 3-methoxyphenyl, allyl, cyclohexylmethyl, benzyl, 2-chloroethyl, methoxymethyl, 2-methoxyethyl, 2-hydroxyethyl, 2-((t-butyl)(diphenyl)silyloxy)ethyl, carboxymethyl, ethoxycarbonylmethyl,

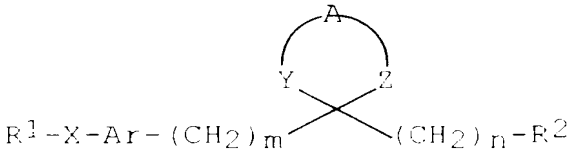
methylcarbamoylmethyl, or 3-pyridyl,
R^{14} is ethyl and R^{15} is methyl,

(e)



wherein
R^{16} is 2-benzothienyl, 2-benzofuranyl, 2(or 3)-thienyl, 2-furyl, 3-pyridyl, 1-methyl-4-pyridyl, 6-methyl-3-pyridyl, 6-methoxy-3-pyridyl, 5-methoxycarbonylamino-3-pyridyl, 5-acetyl-2-thienyl, 1-methylcarbamoyl-5-benzofuranyl.

10. A process for the preparation of a compound of the formula:

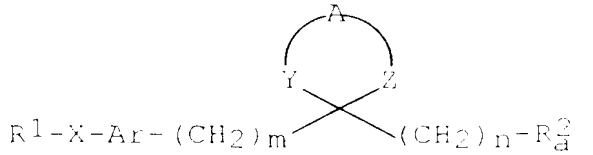


(I)

in which R^1, R^2, Ar, A, X, Y, Z, m and n are each as defined in Claim 1,

which comprises

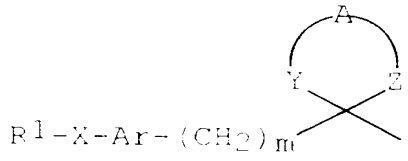
(1) subjecting a compound of the formula:



(I-a)

or a salt thereof to removal reaction of the carboxy-

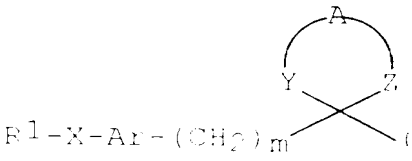
protective group, to give a compound of the formula:



R^1-X-Ar-$(CH_2)_m$ (A, Y, Z) $(CH_2)_n$-COOH (I-b)

or a salt thereof; or

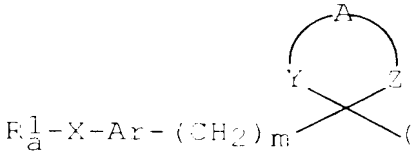
(2) oxidating the vinyl group of a compound of the formula:



R^1-X-Ar-$(CH_2)_m$ (A, Y, Z) $(CH_2)_n$-CH=CH_2 (I)

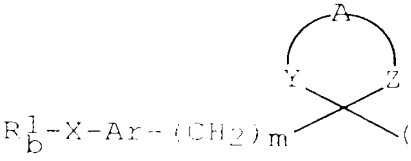
or a salt thereof, to give a compound of the above formula (I-b) or a salt thereof; or

(3) reducing a compound of the formula:



R^1_a-X-Ar-$(CH_2)_m$ (A, Y, Z) $(CH_2)_n$-R^2 (I-c)

or a salt thereof, to give a compound of the formula:



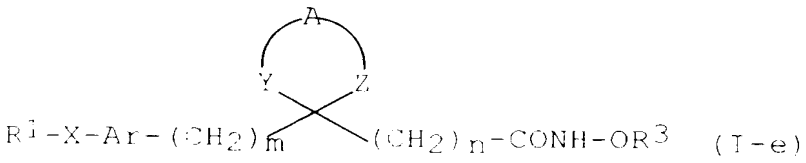
R^1_b-X-Ar-$(CH_2)_m$ (A, Y, Z) $(CH_2)_n$-R^2 (I-d)

or a salt thereof; or

(4) reacting a compound of the above formula (I-b) or its reactive derivative at the carboxy-group, or a salt thereof, with a compound of the formula:

NH_2-OR^3 (IV)

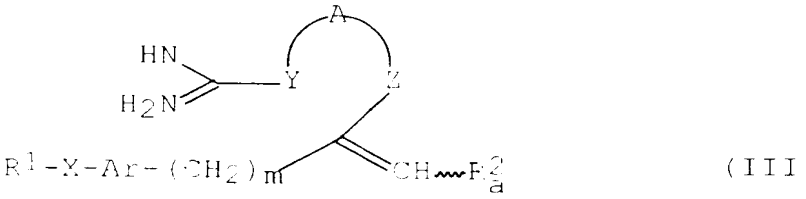
or its reactive derivative at the amino-group, or a salt thereof, to give a compound of the formula:



(I-e)

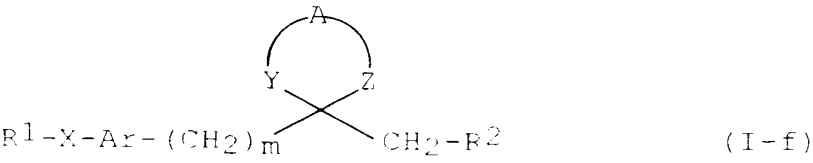
or a salt thereof; or

(5) cyclizing a compound of the formula:



(III)

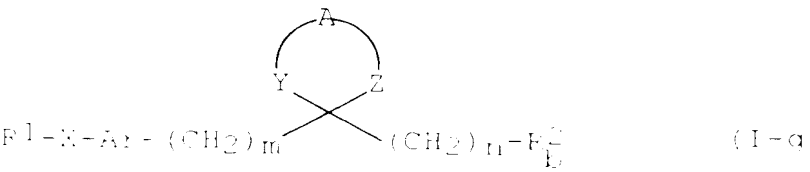
or a salt thereof, to give a compound of the formula:



(I-f)

or a salt thereof; or

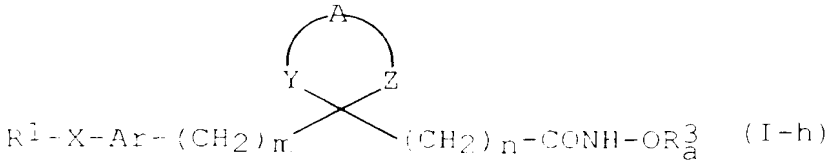
(6) reacting a compound of the above formula (I-b) or its reactive derivative at the carboxy-group, or a salt thereof, with an optically active amine or its reactive derivative at the amino-group, or a salt thereof, to give a compound of the formula:



(I-g)

or a salt thereof; or

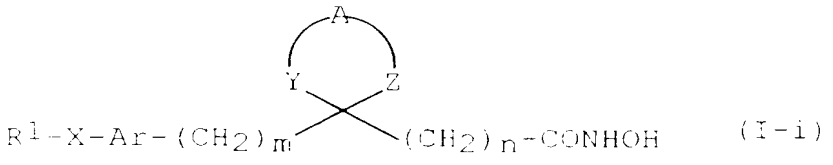
(7) subjecting a compound of the formula:



$$R^1\text{-}X\text{-}Ar\text{-}(CH_2)_m \quad (CH_2)_n\text{-}CONH\text{-}OR^3_a \qquad (I\text{-}h)$$

(A, Y, Z)

or a salt thereof to removal reaction of the hydroxy-protective group, to give a compound of the formula:

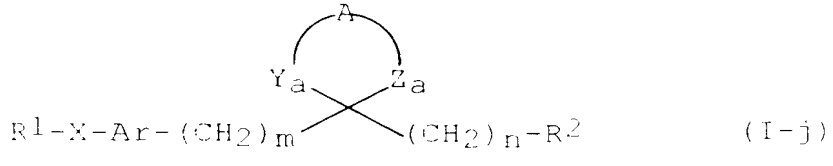


$$R^1\text{-}X\text{-}Ar\text{-}(CH_2)_m \quad (CH_2)_n\text{-}CONHOH \qquad (I\text{-}i)$$

(A, Y, Z)

or a salt thereof; or

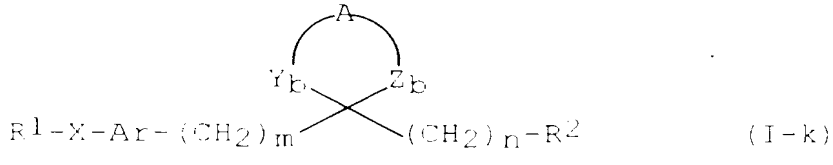
(8) oxidating a compound of the formula:



$$R^1\text{-}X\text{-}Ar\text{-}(CH_2)_m \quad (CH_2)_n\text{-}R^2 \qquad (I\text{-}j)$$

(A, Y_a, Z_a)

or a salt thereof, to give a compound of the formula:

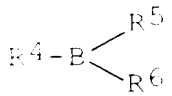


$$R^1\text{-}X\text{-}Ar\text{-}(CH_2)_m \quad (CH_2)_n\text{-}R^2 \qquad (I\text{-}k)$$

(A, Y_b, Z_b)

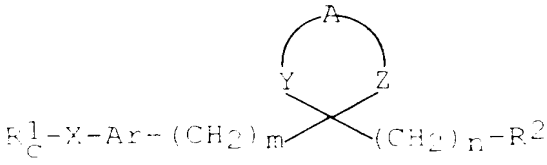
or a salt thereof; or

(9) reacting a compound of the above formula (I-c) or a salt thereof, with a compound of the formula:



(V)

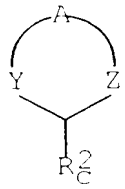
to give a compound of the formula:



(I-l)

or a salt thereof; or

(10) reacting a compound of the formula:

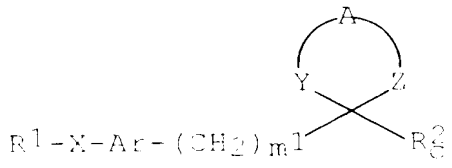


(VI)

or a salt thereof, with a compound of the formula:

$$R^1\text{-}X\text{-}Ar\text{-}(CH_2)_{m1}\text{-}L \qquad \text{(VII)}$$

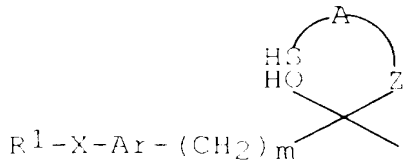
or a salt thereof, to give a compound of the formula:



(I-m)

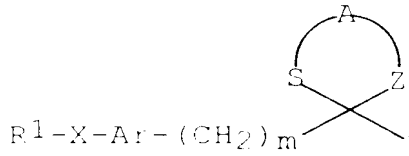
or a salt thereof; or

(11) cyclizing a compound of the formula:



(VIII)

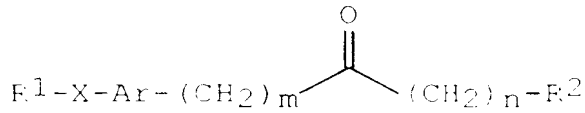
or a salt thereof, to give a compound of the formula:



(I-n)

or a salt thereof; or

(12) reacting a compound of the formula:

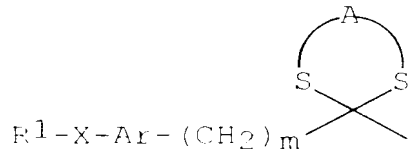


(IX)

or a salt thereof, with a compound of the formula:

HS-A-SH (X)

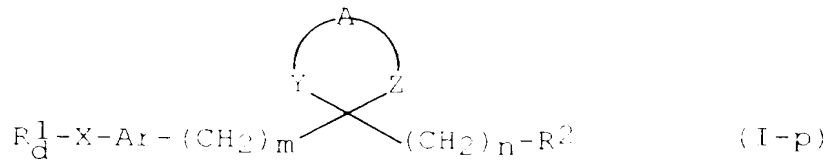
to give a compound of the formula:



(I-o)

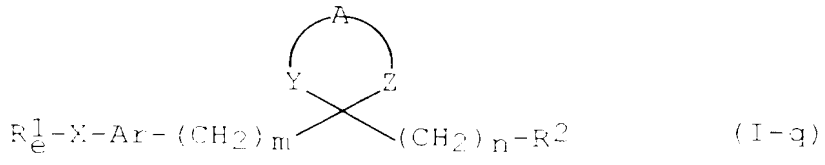
or a salt thereof; or

(13) amidating a compound of the formula:



R^1_d-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-p)

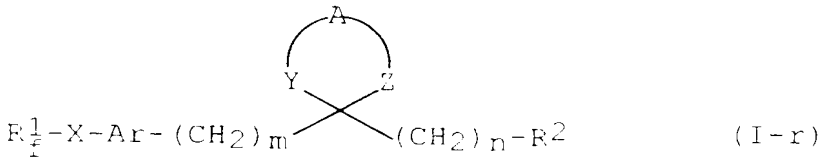
or its reactive derivative at the carboxy group, or a salt thereof, to give a compound of the formula:



R^1_e-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-q)

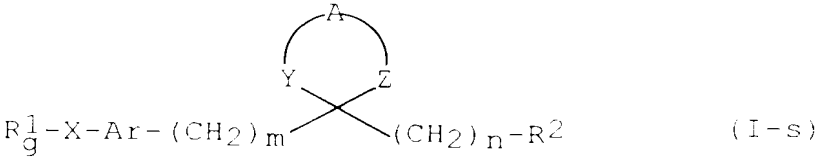
or a salt thereof; or

(14) acylating a compound of the formula:



R^1_f-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-r)

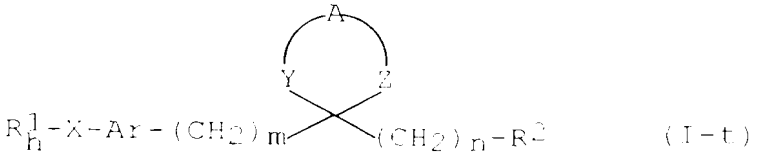
or its reactive derivative at the amino group, or a salt thereof, to give a compound of the formula:



R^1_g-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-s)

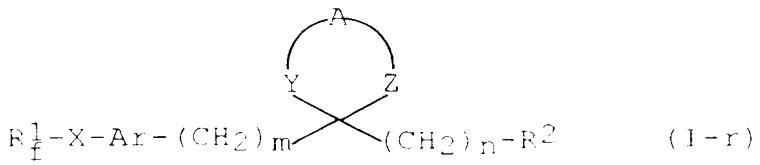
or a salt thereof; or

(15) subjecting a compound of the formula:



R^1_h-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-t)

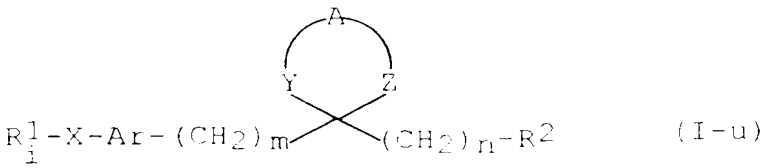
or a salt thereof to a removal reaction of the amino-protective group, to give a compound of the formula:



(I-r)

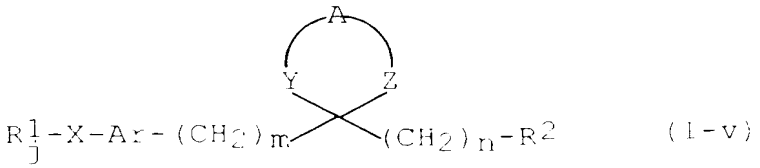
or a salt thereof; or

(16) subjecting a compound of the formula:



(I-u)

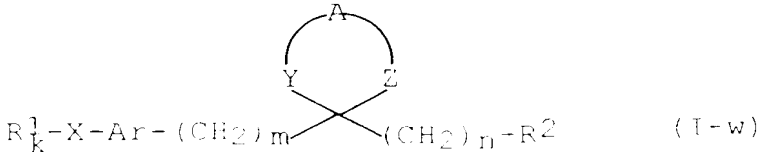
or a salt thereof to a removal reaction of the hydroxy-protective group, to give a compound of the formula:



(I-v)

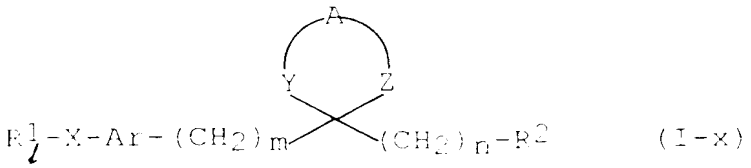
or a salt thereof; or

(17) oxidating a compound of the formula:



(I-w)

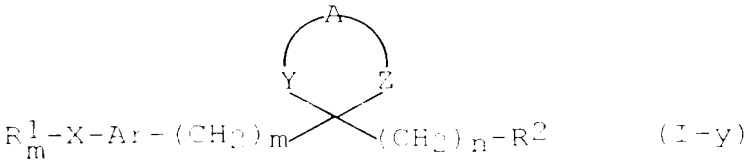
or a salt thereof, to give a compound of the formula:



R^1_l-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-x)

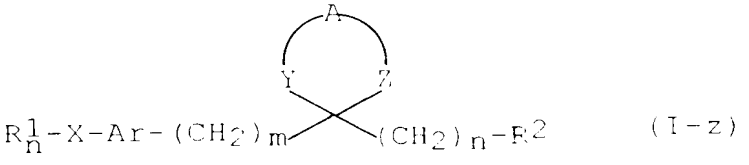
or a salt thereof; or

(18) reducing a compound of the formula:



R^1_m-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-y)

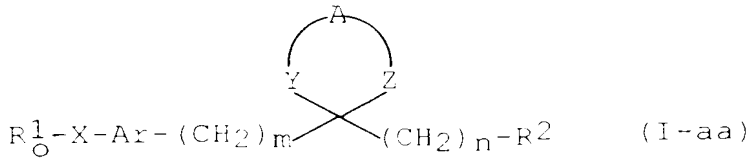
or a salt thereof, to give a compound of the formula:



R^1_n-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-z)

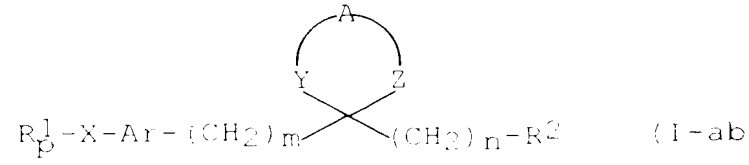
or a salt thereof; or

(19) oxidating a compound of the formula:



R^1_o-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-aa)

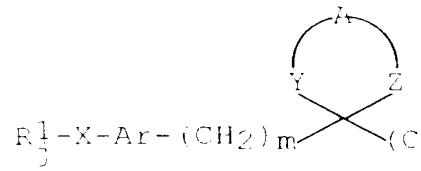
or a salt thereof, to give a compound of the formula:



R^1_p-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-ab)

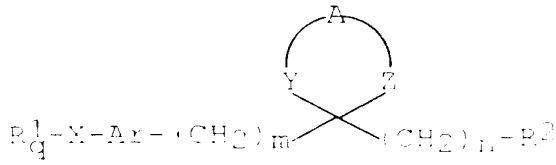
or a salt thereof; or

(20) acylating a compound of the formula:



(I-v)

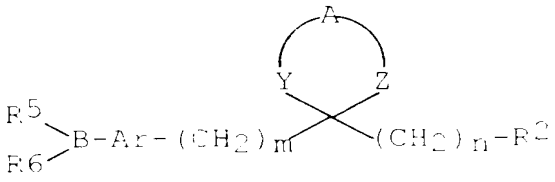
or a salt thereof, to give a compound of the formula:



(I-ac)

or a salt thereof; or

(21) reacting a compound of the formula:

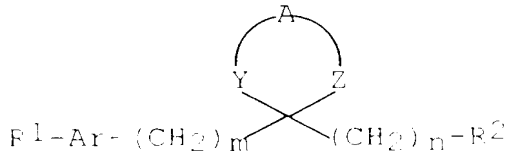


(XI)

or a salt thereof, with a compound of the formula:

$$R^1\text{-}L \qquad \text{(XII)}$$

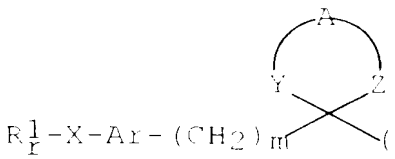
or a salt thereof, to give a compound of the formula:



(I-ad)

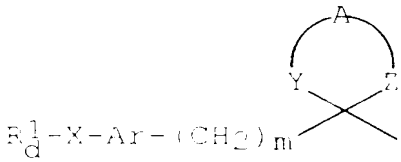
or a salt thereof; or

(22) subjecting a compound of the formula:



R^1_f-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-ae)

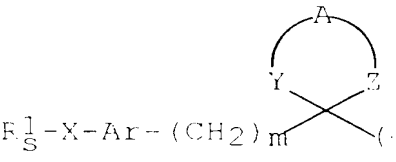
or a salt thereof, to a removal reaction of the carboxy-protective group, to give a compound of the formula:



R^1_d-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-p)

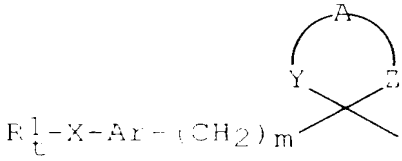
or a salt thereof; or

(23) reacting a compound of the formula:



R^1_s-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-af)

or a salt thereof, with a substituted amine, to give a compound of the formula:



R^1_t-X-Ar-$(CH_2)_m$ $(CH_2)_n$-R^2 (I-ag)

or a salt thereof,

in which R^1, R^2, Ar, A, X, Y, Z, m and n are each as defined above,

R^1_a is haloaryl or halo,

R^1_b is aryl,

R^1_c is aryl at least substituted by optionally

substituted aryl,

R^1_d is aryl at least having carboxy moiety,

R^1_e is aryl at least having amido moiety,

R^1_f is aryl at least having amino moiety,

R^1_g is aryl at least having acylamino moiety,

R^1_h is aryl at least having protected amino moiety,

R^1_i is aryl at least having protected hydroxy moiety,

R^1_j is aryl at least having hydroxy moiety,

R^1_k is aryl at least having thia moiety,

R^1_l is aryl at least having sulfinyl or sulfonyl moiety,

R^1_m is aryl at least having formyl moiety,

R^1_n is aryl at least having hydroxymethyl moiety,

R^1_o is aryl at least having vinyl moiety,

R^1_p is aryl at least having 1,2-dihydroxyethyl moiety,

R^1_q is aryl at least having acyloxy moiety,

R^1_r is aryl at least having protected carboxy moiety,

R^1_s is aryl at least having halo(lower)alkanoyl moiety,

R^1_t is aryl at least having substituted amino(lower)alkanoyl moiety,

R^2_a is protected carboxy,

R^2_b is optically active amide,

R^2_c is protected carboxy,

R^3 is hydrogen or hydroxy-protective group,

R^3_a is hydroxy-protective group,

R^4 is optionally substituted aryl,

R^5 and R^6 are each hydrogen or combinedtogether to form lower alkylene,

Y_a is thia, sulfinyl or sulfonyl,

Z_a is methylene, thia, sulfinyl or sulfonyl, provided that at least one of Y_a and Z_a is thia or sulfinyl,

Y_b is thia, sulfinyl or sulfonyl,

Z_b is methylene, thia, sulfinyl or sulfonyl,
provided that at least one of
Y_b and Z_b is sulfinyl or sulfonyl,
L is a leaving group, and
m^1 is an integer of 1 to 6.

11. A pharmaceutical composition which comprises the compound of Claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier or excipient.

12. A process for preparing a pharmaceutical composition which comprises admixing the compound of Claim 1 or a pharmaceutically acceptable salt thereof with a pharmaceutically acceptable carrier or excipient.

13. Use of the compound of Claim 1 or a pharmaceutically acceptable salt thereof as a medicament.

14. Use of the compound of Claim 1 or a pharmaceutically acceptable salt thereof as an inhibitor of matrix metalloproteinases (MMP) or tumor necrosis factor α (TNF α).

15. Use of the compound of Claim 1 or a pharmaceutically acceptable salt thereof for manufacturing a medicament for treating and/or preventing MMP- or TNF α-mediated diseases.

16. A method for treating and/or preventing MMP- or TNF α-mediated diseases which comprises administering the compound of Claim 1 or a pharmaceutically acceptable salt thereof to a human being or an animal.

17. Use of the compound of Claim 1 or a pharmaceutically

acceptable salt thereof for treating and/or preventing MMP- or TNF α-mediated diseases.